

RF EXPOSURE EVALUATION

KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

EUT Specification

FCC ID	2BRP2-XPRO
EUT	XPro, Legend
Frequency band (Operating)	☒ BT: 2.402GHz ~ 2.480GHz ☒ WLAN: 2.412GHz ~ 2.462GHz ☐ RLAN: 5.180GHz ~ 5.240GHz ☐ RLAN: 5.260GHz ~ 5.320GHz ☐ RLAN: 5.500GHz ~ 5.700GHz ☐ RLAN: 5.745GHz ~ 5.825GHz ☒ Others: FDD Band 2: 1850.7MHz ~ 1909.3MHz FDD Band 4: 1710.7MHz ~ 1754.3MHz FDD Band 5: 824.7MHz ~ 848.3MHz FDD Band 7: 2502.5MHz ~ 2567.5MHz FDD Band 12: 699.7MHz ~ 715.3MHz FDD Band 13: 779.5MHz ~ 784.5MHz FDD Band 14: 790.5MHz ~ 795.5MHz FDD Band 17: 706.5MHz ~ 713.5MHz FDD Band 25: 1850.7MHz ~ 1914.3MHz FDD Band 26: 814.7MHz ~ 848.3MHz TDD Band 41: 2498.5MHz ~ 2687.5MHz FDD Band 66: 1710.7MHz ~ 1779.3MHz FDD Band 71: 665.5MHz ~ 695.5MHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity

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Antenna gain (Max)	Wi-Fi 2.4G: 5.84 dBi Wi-Fi 5.2G: 3.46 dBi Wi-Fi 5.8G: 2.56 dBi FDD Band 2: 3.55dBi FDD Band 4: 4.30dBi FDD Band 5: -1.12dBi FDD Band 7: 2.53dBi FDD Band 12: -4.21dBi FDD Band 13: 0.29dBi FDD Band 14: 0.41dBi FDD Band 17: -0.08dBi FDD Band 25: 3.55dBi FDD Band 26: 2.53dBi TDD Band 41: 3.47dBi FDD Band 66: 4.30dBi FDD Band 71: -2.16dBi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm ²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} =output power to antenna in Mw

G = gain of antenna in linear scale

π =3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Max Measurement Result

Operating Mode	Measured Power	Tune up tolerance		Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(dBm)	(dBm)		(dBm)	(dBi)	(mW/ cm ²)	
WiFi 2.4G	16.97	19.95	±1	20.95	5.84	0.0950	1
WiFi 5.2G	17.63	16.00	±1	17.00	3.46	0.0221	1
WiFi 5.8G	17.05	17.26	±1	18.26	2.56	0.0240	1
FDD Band 2	23.81	23.81	±1	24.81	3.55	0.1364	1
FDD Band 4	24.32	24.32	±1	25.32	4.3	0.1824	1
FDD Band 5	24.57	24.57	±1	25.57	-1.12	0.0555	0.5498
FDD Band 7	24.16	24.16	±1	25.16	2.53	0.1169	1
FDD Band 12	24.73	24.73	±1	25.73	-4.21	0.0282	0.4665
FDD Band 13	24.53	54.53	±1	25.53	0.29	0.0760	0.5197
FDD Band 14	22.63	22.63	±1	23.63	0.41	0.0505	0.5270
FDD Band 17	23.17	23.17	±1	24.17	-0.08	0.0510	0.4710
FDD Band 25	24.4	24.4	±1	25.40	3.55	0.1563	1
FDD Band 26(814-824=-10)	24.18	24.18	±1	25.18	2.53	0.1175	0.5431

FDD Band 26(824-849)	24.48	24.48 ±1	25.48	2.53	0.1259	0.5493
FDD Band 41	23.75	23.75 ±1	24.75	3.47	0.1321	1
FDD Band 66	22.02	22.02 ±1	23.02	4.3	0.1074	1
FDD Band 71	23.56	23.56 ±1	24.56	-2.16	0.0346	0.4437

The Maximum simultaneous transmission for BLE+WiFi 2.4G ANT2:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

=S_{LTD}/S_{limit-2.4}+ S_{WLAN}/S_{limit-2.4}
 =0.1824/1+0.0240/1
 =0.2060
 < 1.0

Result: PASS.